ST-V50L/V70L

SERVICE MANUAL

AEP Model
UK Model

ST-V50L and ST-V70L are FM stereo/FM-AM tuner units in LBT-V50W and LBT-V70WR, respectively.

SPECIFICATION

System: FM stereo, FM/AM superheterodyne tuner
Quartz-locked PLL digital synthesizer system

FM tuner section

Tuning range: 87.5 – 108 MHz
Antenna terminals
75 ohms unbalanced
300 ohms balanced
Intermediate frequency
10.7 MHz

	(at 40 kHz deviation)
Sensitivity	at 46 dB quieting 19.5 dBf, 5 μV (mono): AEP, UK model 2.5 μV (mono): G-AEP model 39.5 dBf, 50 μV (stereo): AEP, UK model 25 μV (steleo): G-AEP model
Usable sensitivity	11.5 dBf, 2 μV (IHF): AEP, UK model 1 μV (IHF): G-AEP model
Signal-to-noise ratio	74 dB (mono) 69 dB (stereo)
Hamonic distortion at 1 kHz	0.3% (mono) 0.5% (stereo)
Separation at 1 kHz	40 dB
Frequency response	40 Hz – 12.5 kHz ± 0.5 dB 30 Hz – 15 kHz $^{+0.5}_{-2.0}$ dB
Selectivity	at 300 kHz 50 dB: AEP, UK model 60 dB: G-AEP model
Image response ratio	50 dB: AEP, UK model 80 dB: G-AEP model
IF response ratio	90 dB: AEP, UK model 93 dB: G-AEP model

MW/LW tuner section

		MW	LW
Tuning range		522 – 1,611 kHz	144 – 288 kHz
Antenna		Layout-free AM antenna, External antenna terminal	
Intermediate frequency		450 kHz	
Usable sensitivity	layout-free Antenna	400 μV/m (999 kHz)	700 μV/m (230 kHz): ST-V70L (216 kHz): ST-V50L
Signal-to-noise ratio		50 dB (50 mV/m): ST-V70L 54 dB (50 mV/m): ST-V50L	
Harmonic distortion		0.3% (50 mV/m, 400 Hz)	
Selectivity		35 dB (9 kHz)	

General

Dimersions: Approx. 355 x 77 x 275 mm (w/h/d)
(14 x 3⅛ x 10⅞ inches)
incl. projecting parts and controls
Weight: Approx. 2 kg (4 lb 7 oz) net

MICROFILM

FM STEREO/FM-AM TUNER

SONY®

AUD

MODEL IDENTIFICATION
– Specification Labels –

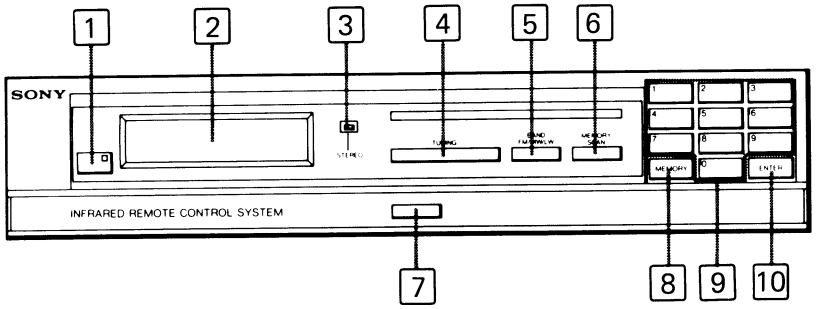
AEP, UK MODEL

SONY® MODEL NO. ST-V70L
FM STEREO/FM-AM TUNER
IF
SERIAL NO.
MADE IN JAPAN

G-AEP MODEL

SONY® MODEL NO. ST-V70L
FM STEREO/FM-AM TUNER
STEREO COMPONENT SYSTEM LBT-V70WR
IF
SERIAL NO
MADE IN JAPAN

FUNCTION OF CONTROLS ST-V70L



[1] **REMOTE SENSOR**
Receives the infrared ray command transmitted from the supplied Remote Commander. (ST-V70L)

[2] **Band/frequency display**
Displays the frequency received, preset station number, TUNED indication and MEMORY indication.

[3] **STEREO indicator**
Lights when an FM stereo program of sufficient signal strength is tuned in.

[4] **TUNING button**
Press the "+" side of the button to tune in a higher frequency, and the "–" side to tune in a lower frequency. To change the frequency continuously, keep the button pressed.

[5] **BAND select button**
Press to select the desired band. The band indication appears in the display. With each press, the band changes as follows.
LW → FM → MW

[6] **MEMORY SCAN button**
To check the preset stations, press this button and press the TUNING button.

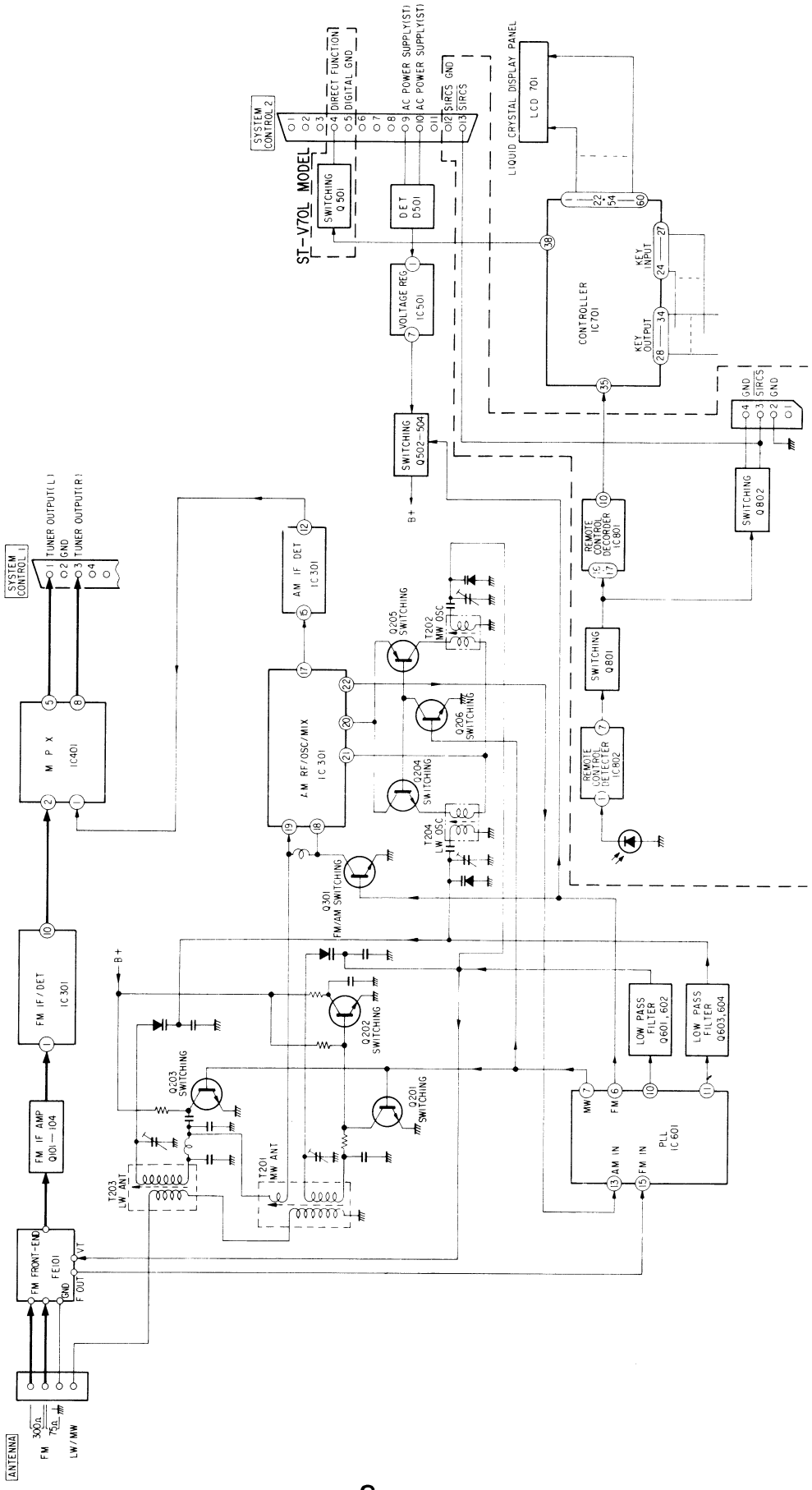
[7] **FM TUNING MODE button**
Selects a tuning system MANUAL or AUTO.
The selected tuning system will be indicated in the band/frequency display.

[8] **MEMORY button**
To memorize a tuned station to a PRESET button, press this button, press the PRESET button and press the ENTER button.

[9] **PRESET buttons**
To call up a memorized station, press the appropriate button and press the ENTER button.

[10] **ENTER button**
To memorized a tuned station to a PRESET button or to call up a memorized station, press this button.

SECTION 1
BLOCK DIAGRAM

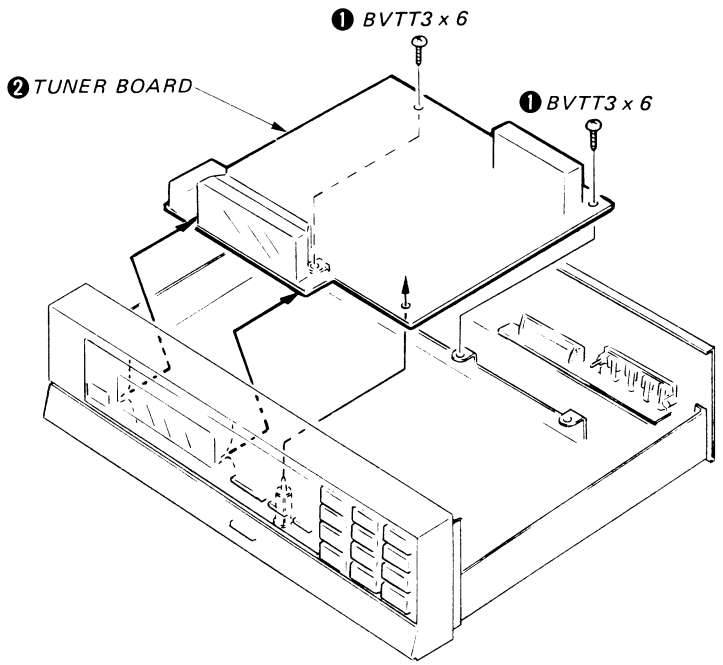


SECTION 2
DISASSEMBLY

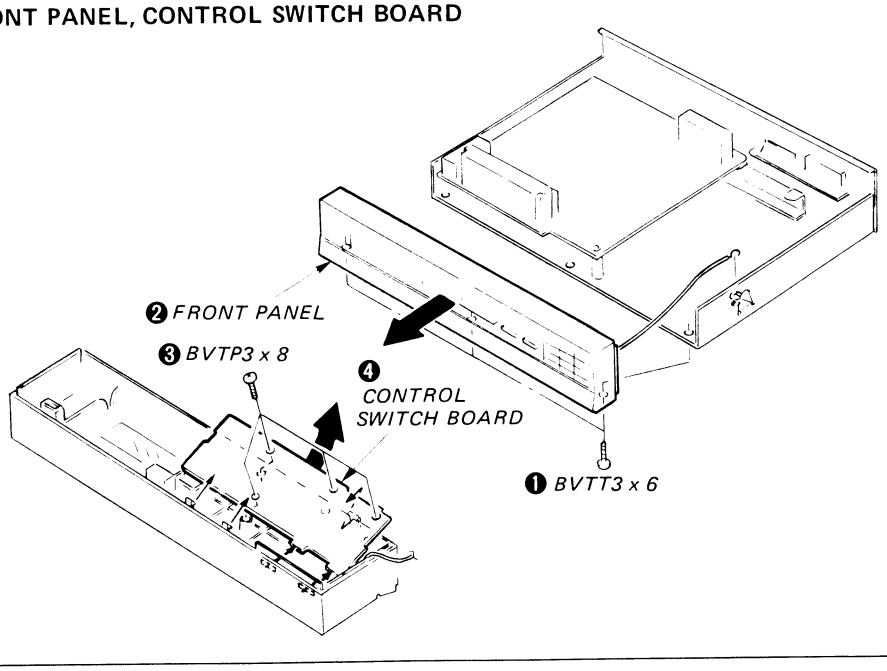
Note: Follow the disassembly procedure in the numerical order given.

CASE REMOVAL
Remove case by taking out four screws.

TUNER BOARD



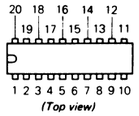
FRONT PANEL, CONTROL SWITCH BOARD



SECTION 4
DIAGRAMS

● Semiconductor Lead Layouts

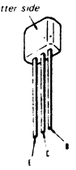
M50760-421P



TC9172P

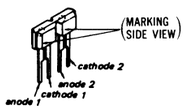
2SC3112-B
2SC380TM-Y

2SA1175



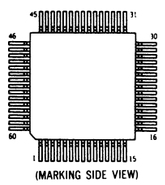
LA1265
LA3401

KV1236Z

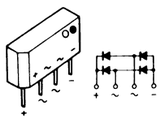


2SK30A-GR3

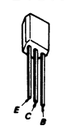
TC9302AF-018



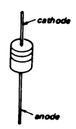
S1VB20



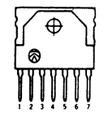
2SC2603-F
DTA144ES
DTC114ES



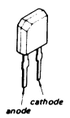
1SS202-1



LA5666

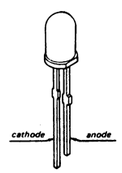


PH302B



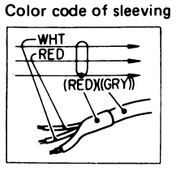
CX20106

SEL1210S-C



Note:

- Color code of sleeving over the end of the jacket.

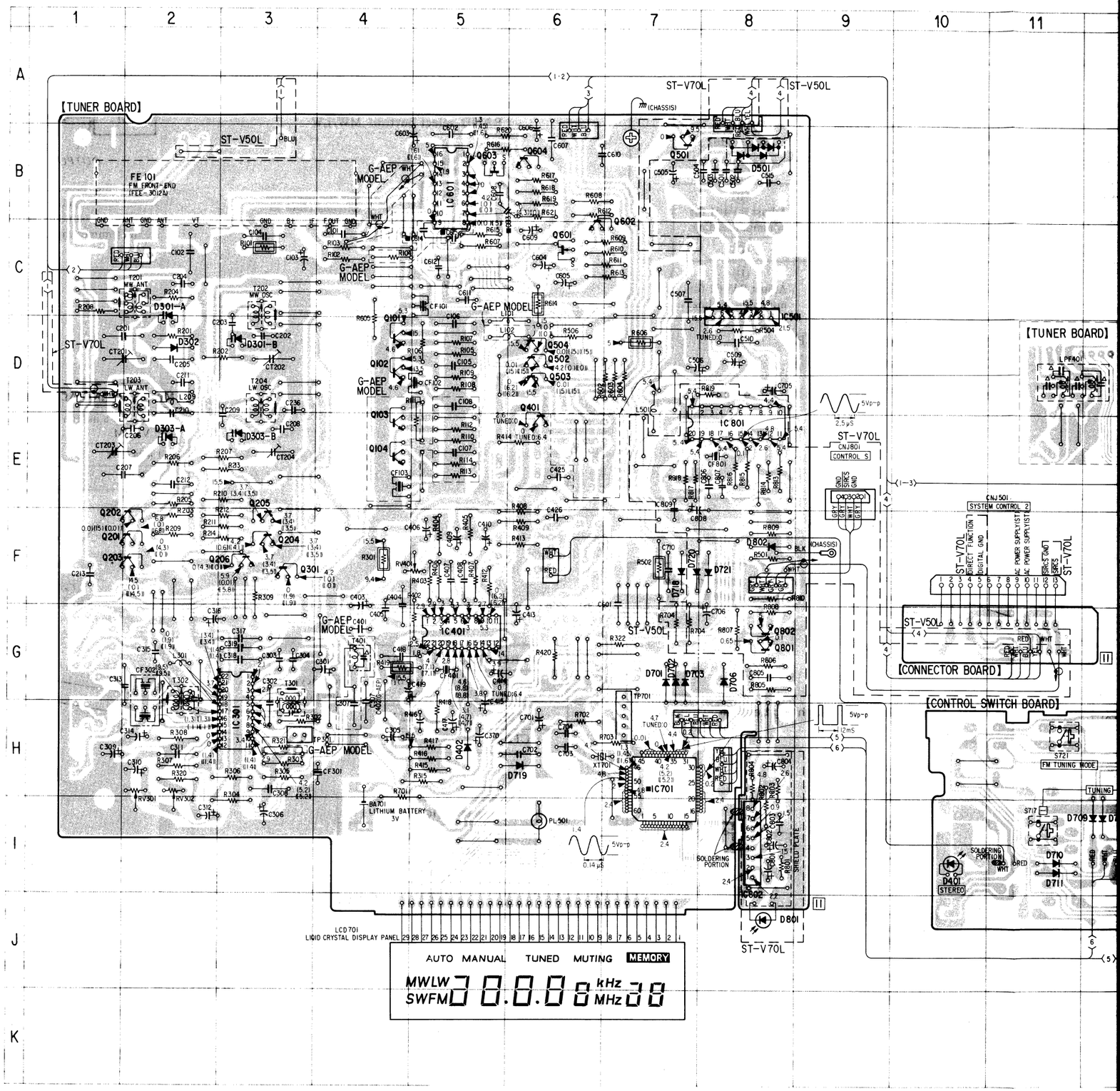


- ○— : parts extracted from the component side.
- ■ : part mounted on the conductor side.
- ⊡ : indicates side identified with part number.

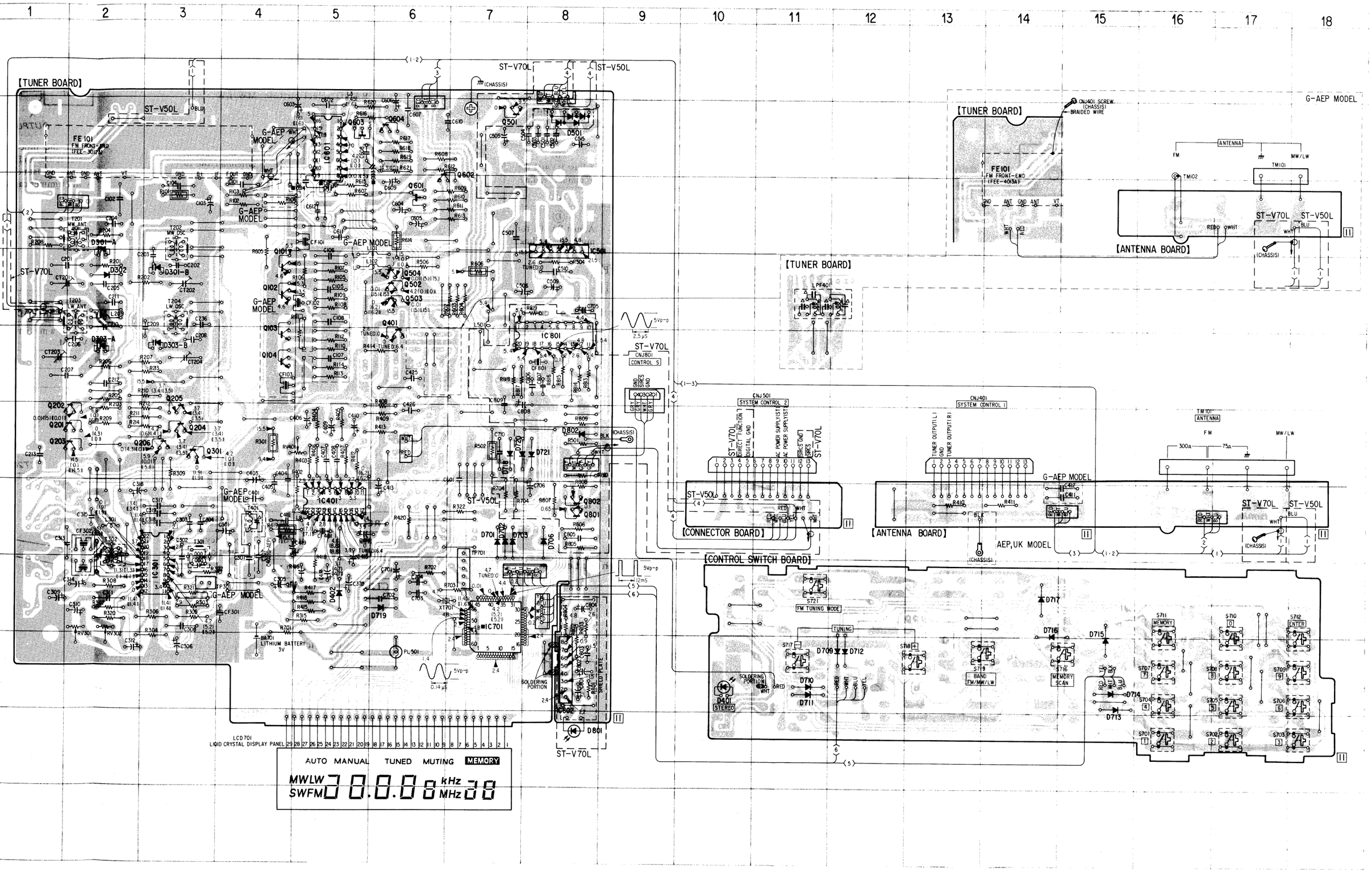
● SEMICONDUCTOR LOCATION

Ref. No.	Location	Ref. No.	Location
D301-A	2-C	IC-301	3-H
D301-B	3-D	IC-401	5-H
D302	2-D	IC-501	8-C
D303-A	2-E	IC-601	5-B
D303-B	3-E	IC-701	7-H
D401	10-I	IC-801	8-E
D402	5-H	IC-802	8-I
D501	8-B	Q101	4-D
D701	7-G	Q102	4-D
D702	7-G	Q103	4-E
D703	7-G	Q104	4-E
D706	8-G	Q201	1-F
D709	12-I	Q202	1-F
D710	11-I	Q203	1-F
D711	11-I	Q204	3-F
D712	12-I	Q205	3-E
D713	15-J	Q206	3-F
D714	15-I	Q301	3-F
D715	15-H	Q401	6-D
D716	14-H	Q501	7-B
D717	14-H	Q502	6-D
D718	7-F	Q503	6-D
D719	6-H	Q504	6-D
D720	7-F	Q601	6-C
D721	8-F	Q602	7-C
D801	8-J	Q603	5-B
D802	8-F	Q604	6-B
		Q801	8-G
		Q802	8-G

4-1. MOUNTING DIAGRAM



G DIAGRAM

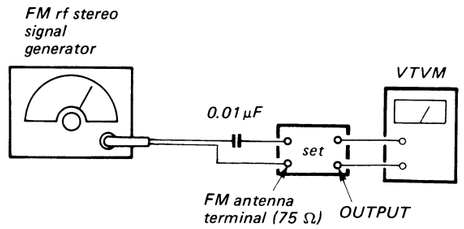

【TUNER BOARD】
ST-V50L
ST-V70L
FE101
FM FRONT-END
(FEE-3012M)
G-AEP MODEL
IC801
IC401
IC701
IC501
CNJ801
CONTROL S
CNJ501
SYSTEM CONTROL 2
CNJ401
SYSTEM CONTROL 1
【CONNECTOR BOARD】
【CONTROL SWITCH BOARD】
【ANTENNA BOARD】
【TUNER BOARD】
AEP,UK MODEL
LCD701
LIQUID CRYSTAL DISPLAY PANEL
AUTO MANUAL TUNED MUTING MEMORY
MW LW SW FM
kHz MHz
(CHASSIS)
SOLDERING PORTION
SHIELD PLATE
BATTERY
3V
S701 S702 S703 S704 S705 S706 S707 S708 S709 S710 S711 S712 S713 S714 S715 S716 S717 S718 S719 S721
D701 D702 D703 D706 D709 D710 D711 D712 D713 D714 D715 D716 D717 D719 D721 D801 D802
Q101 Q102 Q103 Q104 Q201 Q202 Q203 Q204 Q205 Q206 Q301 Q401 Q501 Q502 Q503 Q504 Q601 Q602 Q801 Q802
ANTENNA
FM
MW/LW
300Ω
75Ω
TUNER OUTPUT(L)
TUNER OUTPUT(R)
GND
BLK
RED
WHT
BLU

SECTION 3
ADJUSTMENTS

FM SECTION

FM stereo Separation Adjustment

Procedure:



Carrier frequency: 98 MHz
Output level: 1 mV (60 dB)
Mode: Stereo
Modulation:
Audio (1 kHz): 33.75 kHz deviation (40.6%)
Pilot (19 kHz): 7.5 kHz deviation (18.8%)
Sub-channel (38 kHz): 33.75 kHz deviation (40.6%)

FM stereo signal generator output channel	VTVM connection	VTVM reading (dB)
L-CH	L-CH	Ⓐ
R-CH	L-CH	Ⓑ Adjust RV401 for minimum reading.
R-CH	R-CH	Ⓒ
L-CH	R-CH	Ⓓ Adjust RV401 for minimum reading.

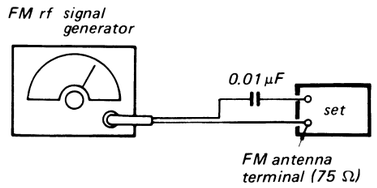
L-CH Stereo separation: Ⓐ – Ⓑ
R-CH Stereo separation: Ⓒ – Ⓓ

The separations of both channels should be equal.

FM Discriminator Alignment

Setting:
BAND select button..... FM

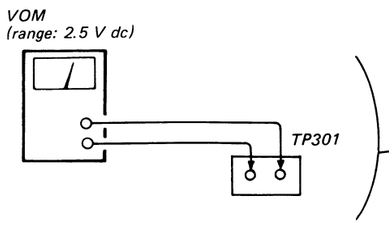
Procedure:

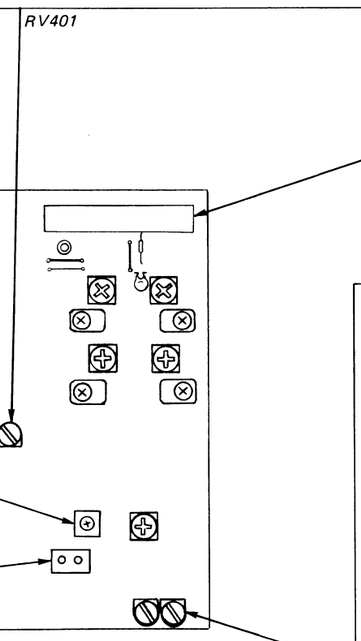


Carrier frequency: 98 MHz
Output level: 1 mV (60 dB)
Modulation: 1 kHz, 40 kHz deviation (100%)

1. Tune the set to 98 MHz.
2. Adjust T301 for 0 V reading on the VOM..... NULL Adjustment

Note: When the ceramic filter is replaced, these adjustments should be made.

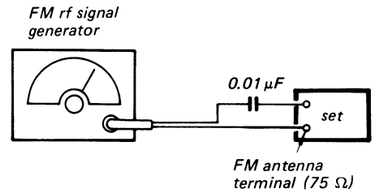




The FM front-end is carefully adjusted at the factory and is supplied as one whole block for replacement.

FM TUNED Indication Lighting Level Adjustment

Setting:



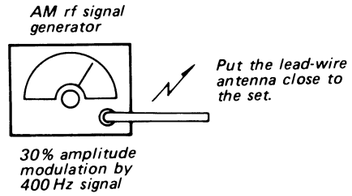
Carrier frequency: 98 MHz
Modulation: 1 kHz, 40 kHz deviation (100%)
Output level: 17.8 µV (25 dB)

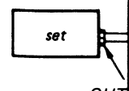
1. Tune the set to 98 MHz.
2. Adjust RV301 so that the TUNED indicator lights up.

MW/LW SECTION

MW adjustment should be performed after LW

Setting:
BAND select button: MW/LW



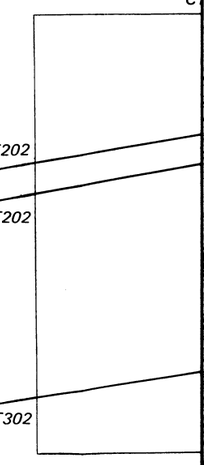


- Repeat the pr several times, a tracking adjust by the trimmer

AM FREQUENCY COVERAGE ADJUSTMENT		
adjustment part	reading on VOM	frequency indication
T202	1.0 ± 0.2 V	522 kHz
CT202	9 ± 0.4 V	1,611 kHz

AM IF ALIGNMENT
Adjust for a maximum reading on VTVM.
450 kHz
T302

MW TRACKING
Adjust for a max on VTVM.
1,404 kHz
CT201



AM TUNED INDICATION L

BAND select switch: LW
1. Output 50.1mV(94d generator.
2. Adjust RV302 so tha

VTVM

PUT

0.6%)

FM stereo signal generator output channel	VTVM connection	VTVM reading (dB)
L-CH	L-CH	Ⓐ
R-CH	L-CH	Ⓑ Adjust RV401 for minimum reading.
R-CH	R-CH	Ⓒ
L-CH	R-CH	Ⓓ Adjust RV401 for minimum reading.

L-CH Stereo separation: Ⓐ – Ⓑ
R-CH Stereo separation: Ⓒ – Ⓓ

The separations of both channels should be equal.

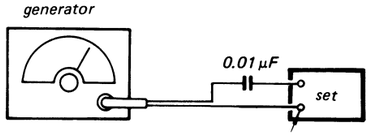
The FM front-end is carefully adjusted at the factory and is supplied as one whole block for replacement.

RV301

FM TUNED Indication Lighting Level Adjustment

Setting:

FM rf signal generator



FM antenna terminal (75 Ω)

Carrier frequency: 98 MHz
Modulation: 1 kHz, 40 kHz deviation (100%)
Output level: 17.8 μV (25 dB)

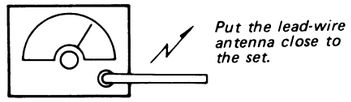
1. Tune the set to 98 MHz.
2. Adjust RV301 so that the TUNED indicator lights up.

MW/LW SECTION **MW adjustment should be performed after LW**

Setting:

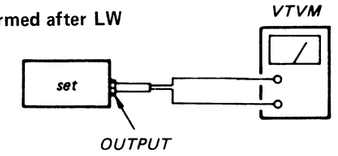
BAND select button: MW/LW

AM rf signal generator

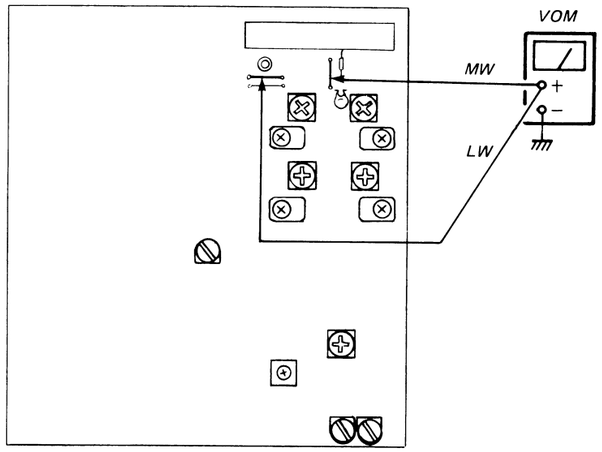


Put the lead-wire antenna close to the set.

30% amplitude modulation by 400 Hz signal



- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.



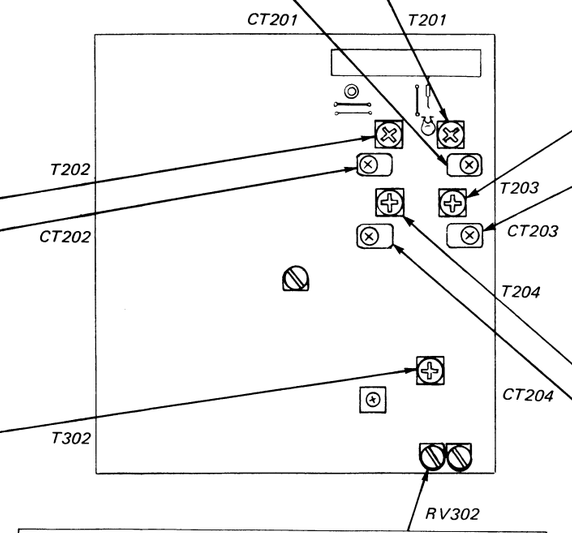
MW TRACKING ADJUSTMENT	
Adjust for a maximum reading on VTVM.	
1,404 kHz	603 kHz
CT201	T201

LW TRACKING ADJUSTMENT	
Adjust for a maximum reading on VTVM.	
162 kHz	270 kHz
T203	CT203

AM FREQUENCY COVERAGE ADJUSTMENT		
adjustment part	reading on VOM	frequency indication
T202	1.0 ± 0.2 V	522 kHz
CT202	9 ± 0.4 V	1,611 kHz

AM IF ALIGNMENT
Adjust for a maximum reading on VTVM.
450 kHz
T302

adjustment part	reading on VOM	frequency indication
T204	1 ± 0.2 V	144 kHz
CT204	9 ± 0.4 V	288 kHz
LW FREQUENCY COVERAGE ADJUSTMENT		



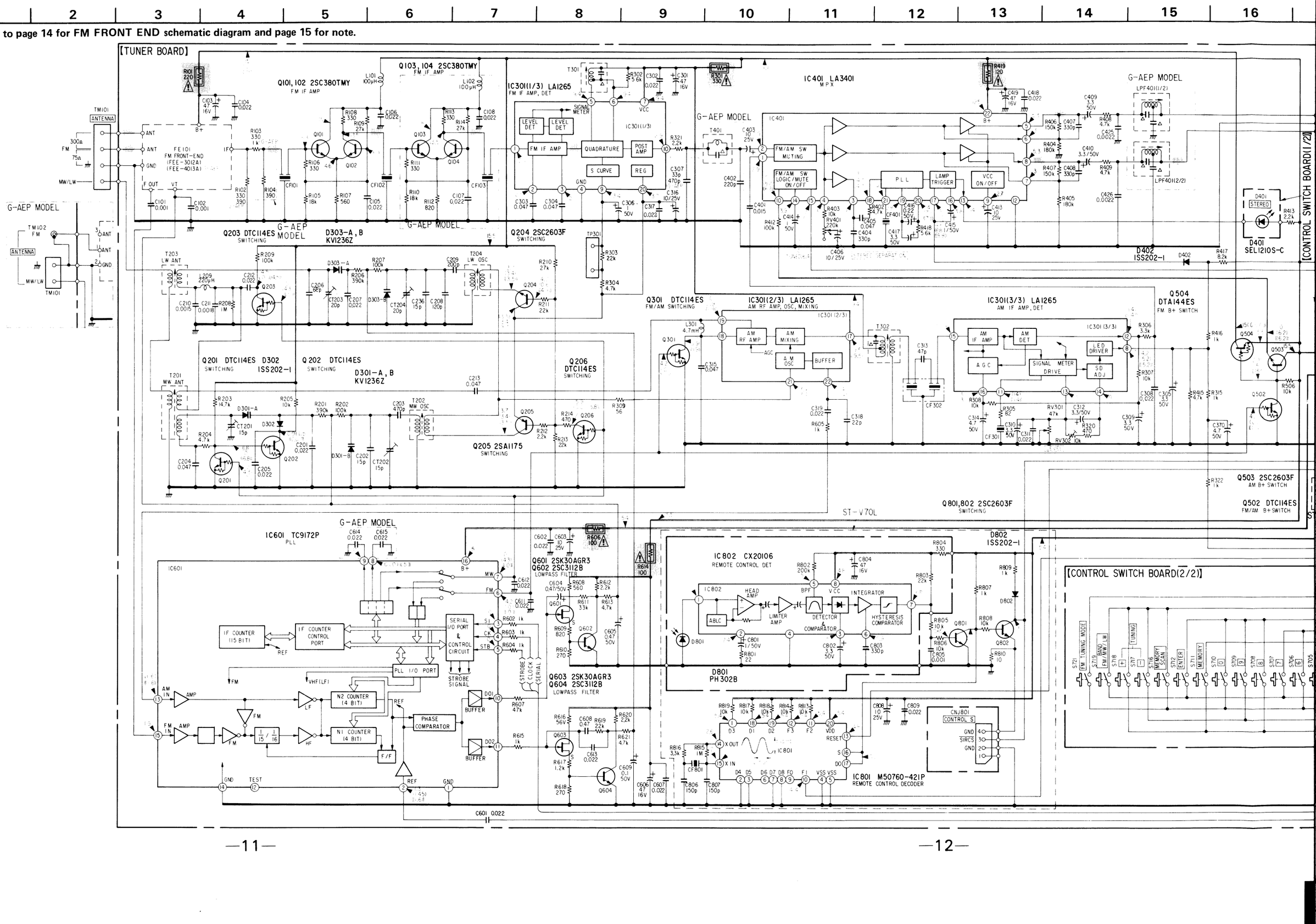
AM TUNED INDICATION LIGHTING LEVEL ADJUSTMENT

BAND select switch: LW

1. Output 50.1mV(94dB), 216kHz from AM rf signal generator.
2. Adjust RV302 so that the LED lights up.

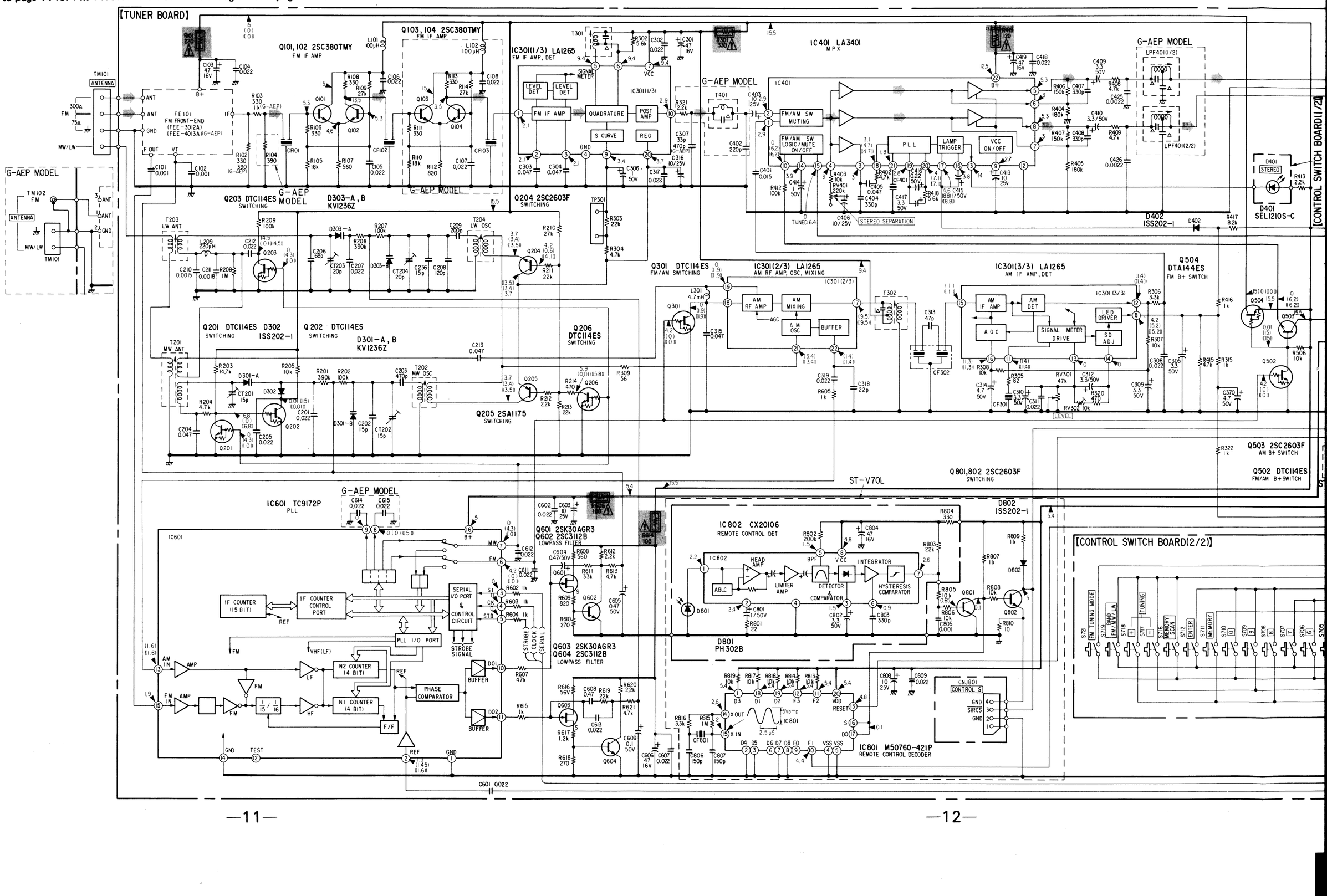
4-2. SCHEMATIC DIAGRAM

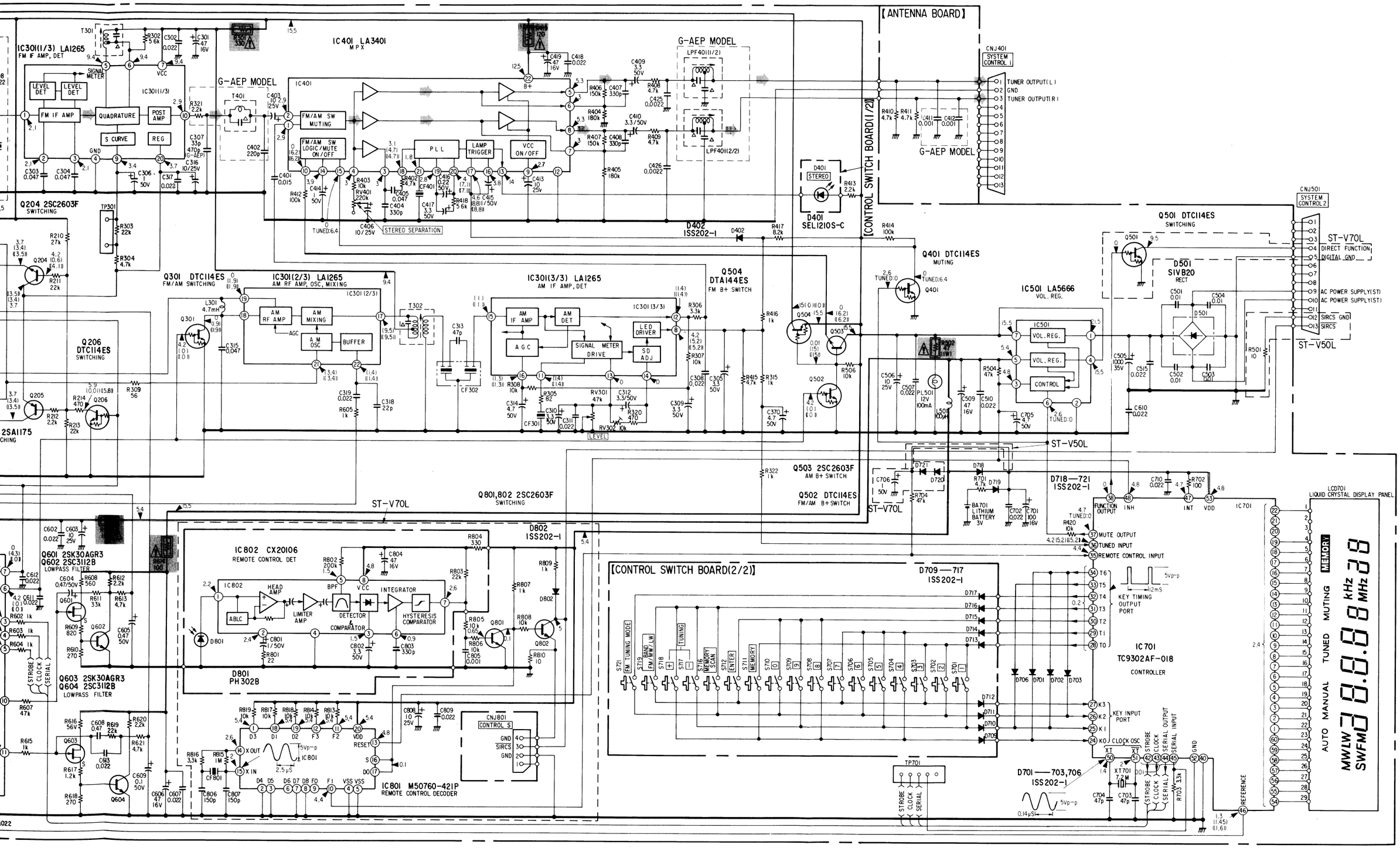
• Refer to page 14 for FM FRONT END schematic diagram and page 15 for note.



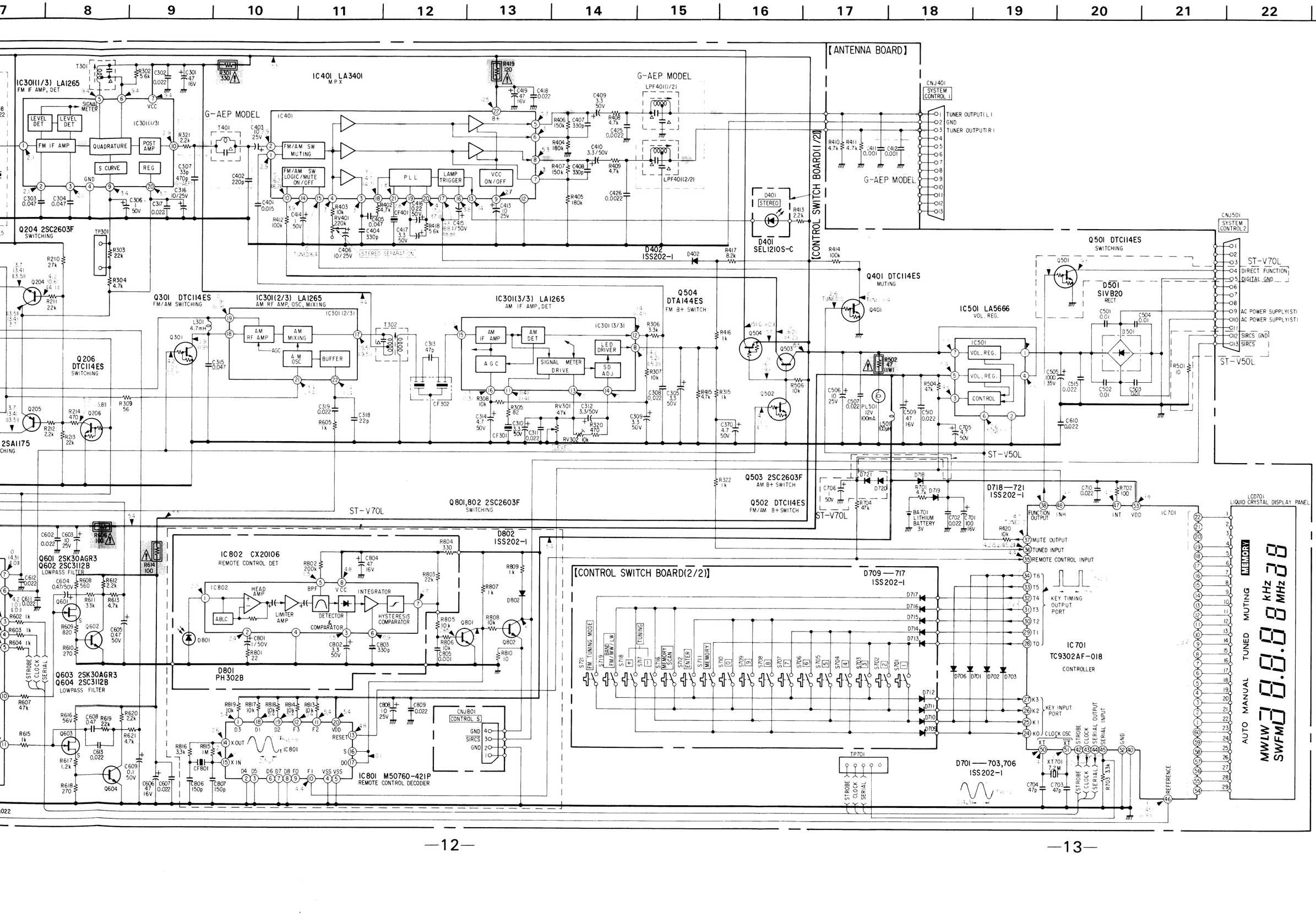
4-2. SCHEMATIC DIAGRAM

• Refer to page 14 for FM FRONT END schematic diagram and page 15 for note.



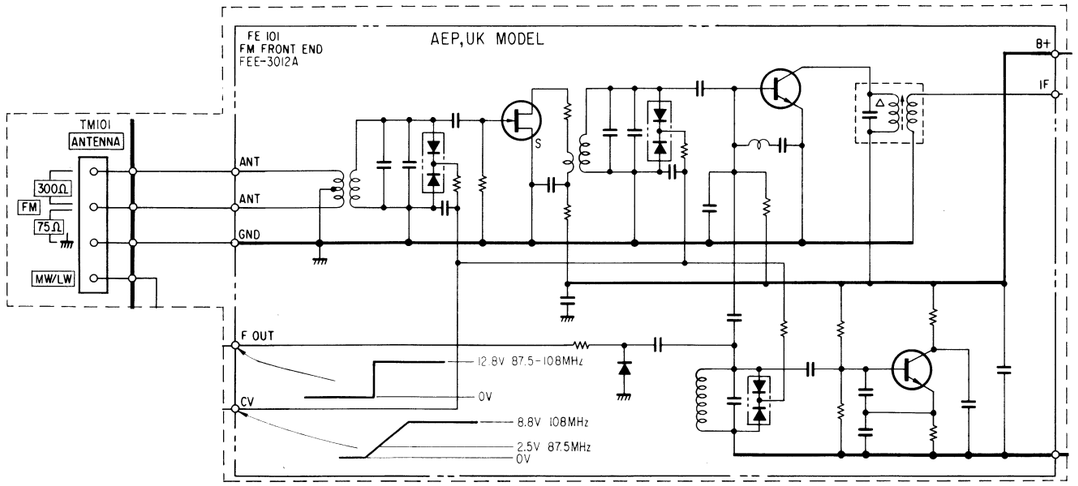

IC301(1/3) LA1265
FM IF AMP, DET
IC401 LA3401
MPX
G-AEP MODEL
【ANTENNA BOARD】
【CONTROL SWITCH BOARD(1/2)】
Q204 2SC2603F
SWITCHING
Q206 DTC114ES
SWITCHING
Q205 2SA1175
Q301 DTC114ES
FM/AM SWITCHING
IC301(2/3) LA1265
AM RF AMP, OSC, MIXING
IC301(3/3) LA1265
AM IF AMP, DET
Q504 DTA144ES
FM B+ SWITCH
Q401 DTC114ES
MUTING
Q501 DTC114ES
SWITCHING
IC501 LA5666
VOL. REG.
D501 SIVB20
RECT
Q502 DTC114ES
FM/AM B+ SWITCH
Q503 2SC2603F
AM B+ SWITCH
Q801,802 2SC2603F
SWITCHING
Q601 2SK30AGR3
Q602 2SC3112B
LOWPASS FILTER
Q603 2SK30AGR3
Q604 2SC3112B
LOWPASS FILTER
IC802 CX20106
REMOTE CONTROL DET
D801 PH302B
IC801 M50760-421P
REMOTE CONTROL DECODER
D802 ISS202-1
D401 SEL1210S-C
D402 ISS202-1
D709 — 717 ISS202-1
D718 — 721 ISS202-1
D701 — 703,706 ISS202-1
IC701 TC9302AF-018
CONTROLLER
LCD701 LIQUID CRYSTAL DISPLAY PANEL
MWLW 1008 kHz
SWFM 0878 MHz 38
AUTO MANUAL TUNED MUTING MEMORY
CNJ401 SYSTEM CONTROL 1
CNJ501 SYSTEM CONTROL 2
CNJ801 CONTROL S
TUNER OUTPUT(L)
GND
TUNER OUTPUT(R)
ST-V70L
DIRECT FUNCTION
DIGITAL GND
AC POWER SUPPLY(ST)
AC POWER SUPPLY(ST)
SIRCS GND
SIRCS
ST-V50L
[CONTROL SWITCH BOARD(2/2)]
KEY TIMING OUTPUT PORT
KEY INPUT PORT
REMOTE CONTROL INPUT
MUTE OUTPUT
TUNED INPUT
FUNCTION OUTPUT
REFERENCE
XT701 7.2M
BA701 LITHIUM BATTERY 3V
PL501 12V 100mA
L501 100μH
T301
T401
T302
T303
TP301
TP701
CF301
CF302
CF401
CF801
LEVEL DET
FM IF AMP
QUADRATURE
POST AMP
S CURVE
REG
FM/AM SW MUTING
FM/AM SW LOGIC/MUTE ON/OFF
PLL
LAMP TRIGGER
VCC ON/OFF
STEREO SEPARATION
AM RF AMP
AM MIXING
AM OSC
BUFFER
AM IF AMP
AM DET
AGC
SIGNAL METER DRIVE
LED DRIVER
SD ADJ
HEAD AMP
ABLC
LIMITER AMP
BPF
VCC
INTEGRATOR
DETECTOR & COMPARATOR
HYSTERESIS COMPARATOR
STEREO
SIGNAL METER
VOL. REG.
CONTROL
MUTE
FM TUNING MODE
BAND FM/MW/LW
TUNING
MEMORY SCAN
ENTER
MEMORY
STROBE
CLOCK
SERIAL
GND
INH
INT
VDD
RESET
VSS
TUNED:0
TUNED:6.4

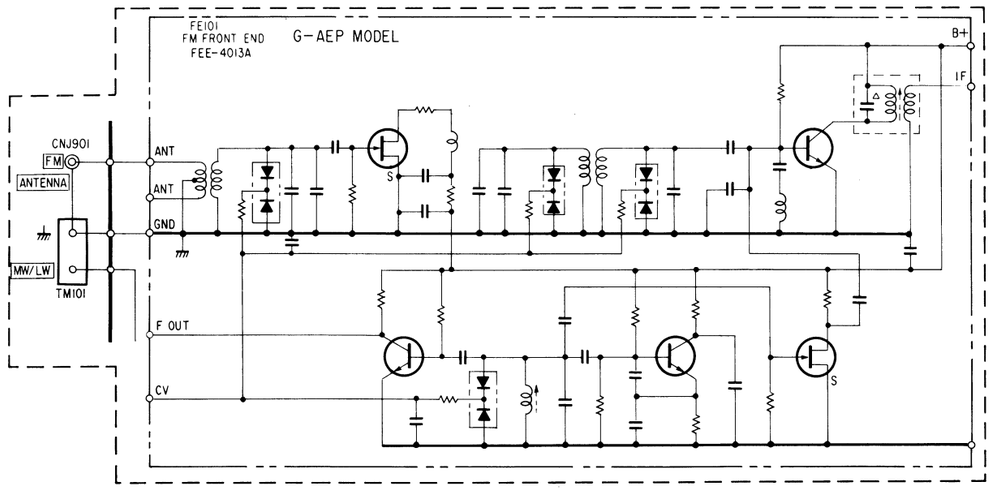
ST-V50L/V70L


IC301(1/3) LA1265
FM IF AMP, DET
IC401 LA3401
MPX
G-AEP MODEL
[ANTENNA BOARD]
CNJ401
SYSTEM CONTROL 1
TUNER OUTPUT(L)
GND
TUNER OUTPUT(R)
[CONTROL SWITCH BOARD(1/2)]
D401
SEL1210S-C
D402
ISS202-1
Q204 2SC2603F
SWITCHING
Q301 DTC114ES
FM/AM SWITCHING
IC301(2/3) LA1265
AM RF AMP, OSC, MIXING
IC301(3/3) LA1265
AM IF AMP, DET
Q504
DTA144ES
FM B+ SWITCH
Q401 DTC114ES
MUTING
IC501 LA5666
VOL. REG.
Q501 DTC114ES
SWITCHING
D501
SIVB20
RECT
CNJ501
SYSTEM CONTROL 2
ST-V70L
DIRECT FUNCTION
DIGITAL GND
AC POWER SUPPLY(ST)
AC POWER SUPPLY(ST)
SIRCS GND
SIRCS
ST-V50L
Q206
DTC114ES
SWITCHING
2SA1175
Q205
Q206
Q503 2SC2603F
AM B+ SWITCH
Q502 DTC114ES
FM/AM B+ SWITCH
ST-V70L
ST-V50L
D718—721
ISS202-1
BA701
LITHIUM
BATTERY
3V
IC701
TC9302AF-018
CONTROLLER
FUNCTION OUTPUT
INH
INT
VDD
MUTE OUTPUT
TUNED INPUT
REMOTE CONTROL INPUT
KEY TIMING OUTPUT PORT
KEY INPUT PORT
CLOCK OSC
STROBE
CLOCK
SERIAL OUTPUT
SERIAL INPUT
GND
REFERENCE
LCD701
LIQUID CRYSTAL DISPLAY PANEL
MEMORY
AUTO MANUAL TUNED MUTING
MW LW 1 8 8 kHz
SW FM 3 8 8 MHz 2 8
Q801,802 2SC2603F
SWITCHING
ST-V70L
IC802 CX20106
REMOTE CONTROL DET
HEAD AMP
ABLC
LIMITER AMP
BPF
VCC
INTEGRATOR
DETECTOR & COMPARATOR
HYSTERESIS COMPARATOR
D801
PH302B
Q601 2SK30AGR3
Q602 2SC3112B
LOWPASS FILTER
Q603 2SK30AGR3
Q604 2SC3112B
LOWPASS FILTER
IC801 M50760-421P
REMOTE CONTROL DECODER
CNJ801
CONTROL S
GND
SIRCS
GND
[CONTROL SWITCH BOARD(2/2)]
D709—717
ISS202-1
D701—703,706
ISS202-1
TP701
STROBE
CLOCK
SERIAL

ST-V50L/V70L ST-V50

4-3. FM FRONT END SCHEMATIC DIAGRAMS





Note:

- All capacitors are in μF unless otherwise noted. pF: μμF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4 W or less unless otherwise specified.
- ⇨ : signal path.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

- △ : internal component.
- ▭ : nonflammable resistor.
- Switch

Ref. No.	Switch	Position
S701	1	OFF
S702	2	OFF
S703	3	OFF
S704	4	OFF
S705	5	OFF
S706	6	OFF
S707	7	OFF
S708	8	OFF
S709	9	OFF
S710	0	OFF
S711	MEMORY	OFF
S712	ENTER	OFF
S716	MEMORY SCAN	OFF
S717	TUNING –	OFF
S718	TUNING +	OFF
S719	BAND FM/MW/LW	OFF
S721	FM TUNING MODE	OFF

- ▬ : B+ bus.
- ▭ : adjustment for repair.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal (detuned) conditions with a VOM (50 kΩ/V).
  no mark : FM
  ( ) : MW
  (( )) : LW
- Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken to ground in detund mode by using oscilloscope.
  Voltage variations may be noted due to normal production tolerances.

NOTE:
The mech
number i
supplied
· Items ma
they are
service.
pated wh

21

20

5

1

No.	Part
1	X-491
	X-491
2	X-491
3	*4-914
4	7-685
5	4-914
6	*4-914
7	*4-914
8	4-914
	4-914
	4-912
	4-912
9	*4-912
10	7-685
11	X-490
12	*4-914

Note:

- All capacitors are in μF unless otherwise noted. pF: μμF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4 W or less unless otherwise specified.
- ⇨ : signal path.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

- △ : internal component.
- ⊣W⊢ : nonflammable resistor.
- Switch

Ref. No.	Switch	Position
S701	1	OFF
S702	2	OFF
S703	3	OFF
S704	4	OFF
S705	5	OFF
S706	6	OFF
S707	7	OFF
S708	8	OFF
S709	9	OFF
S710	0	OFF
S711	MEMORY	OFF
S712	ENTER	OFF
S716	MEMORY SCAN	OFF
S717	TUNING –	OFF
S718	TUNING +	OFF
S719	BAND FM/MW/LW	OFF
S721	FM TUNING MODE	OFF

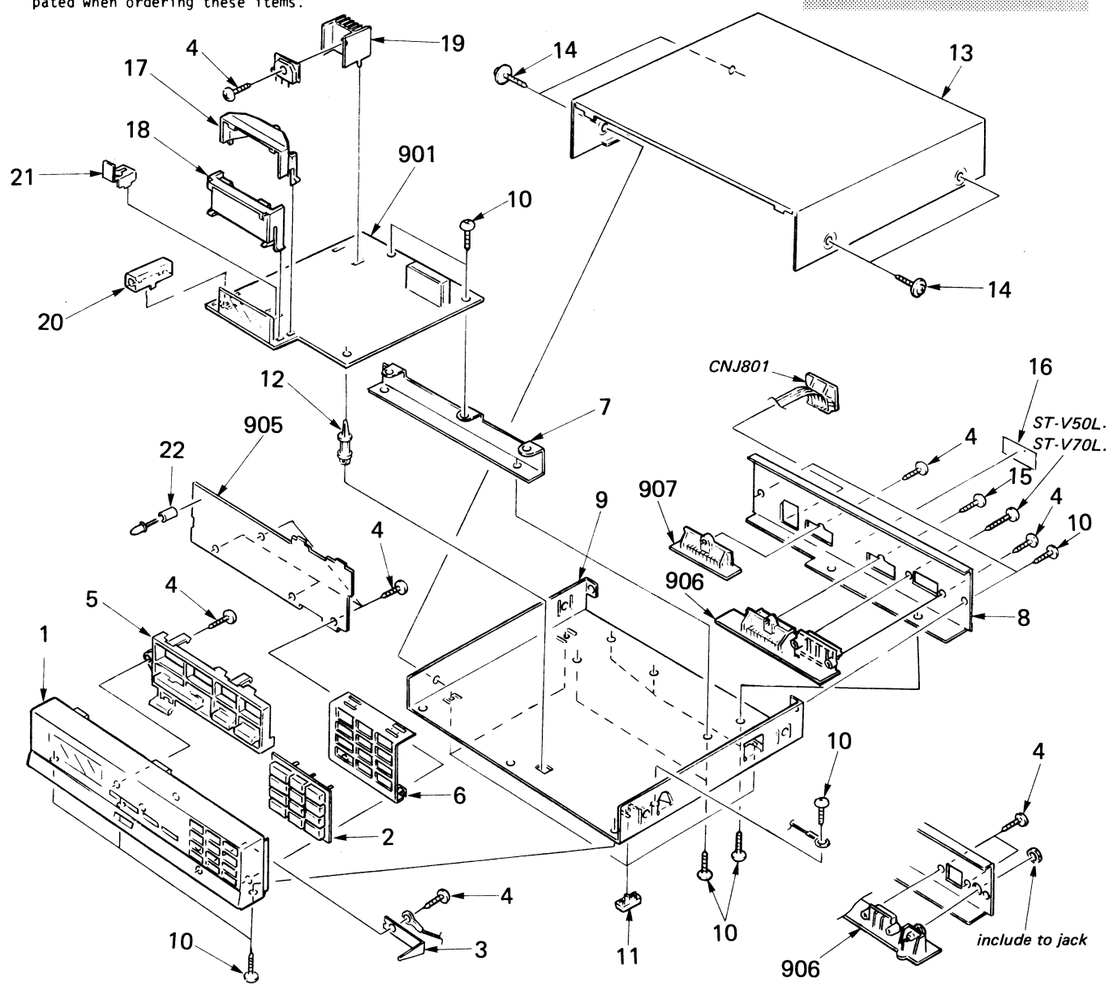
- ▬▬ : B+ bus.
- ▭ : adjustment for repair.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal (detuned) conditions with a VOM (50 kΩ/V).
  no mark: FM
  ( ) : MW
  (( )) : LW
- Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken to ground in detund mode by using oscilloscope.
  Voltage variations may be noted due to normal production tolerances.

SECTION 5
EXPLODED VIEWS AND PARTS LIST

NOTE:
The mechanical parts with no reference number in the exploded views are not supplied.

- Items marked " ★ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The construction parts of an assembled part are indicated with a collation number in the remark column.

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.



No.	Part No.	Description	Remarks
1	X-4914-012-1	(ST-V50L)...PANEL ASSY, FRONT	
	X-4914-017-1	(ST-V70L)...PANEL ASSY, FRONT	
2	X-4914-014-1	KNOB ASSY, PUSH	
3	*4-914-034-01	PLATE, GROUND	
4	7-685-646-11	SCREW +BVTP 3X8 TYPE2 N-S	
5	4-914-010-01	KNOB BLOCK	
6	*4-914-009-01	RETAINER, KNOB	
7	*4-914-007-01	BRACKET	
8	4-914-001-01	(ST-V70L:AEP,UK)...PLATE, JACK	
	4-914-001-23	(ST-V70L:G-AEP)....PLATE, JACK	
	4-912-001-41	(ST-V50L:AEP,UK)...PLATE, JACK	
	4-912-001-53	(ST-V50L:G-AEP)....PLATE, JACK	
9	*4-912-118-01	CHASSIS	
10	7-685-871-01	SCREW +BVTT 3X6 (S)	
11	X-4907-603-1	FOOT ASSY	
12	*4-914-008-01	HOLDER, PCB	

No.	Part No.	Description	Remarks
13	4-912-115-01	CASE	
14	4-886-821-01	SCREW, M3 CASE	
15	3-703-473-00	SCREW, TERMINAL	
16	4-914-032-01	LABEL, MODEL NUMBER (FR)	
17	*4-904-515-01	HOUSE, LAMP	
18	*4-909-633-01	ILLUMINATOR	
19	*4-363-146-51	HEAT SINK, V.OUT	
20	*4-909-705-01	(ST-V70L)...PLATE, SHIELD	
21	*4-914-005-01	BLIND (2)	
22	4-886-543-21	TUBE, CUSHION	
901	A-4351-500-A	MOUNTED PCB, TUNER	
905	*1-618-065-11	PC BOARD, CONTROL SWITCH	
906	*1-618-352-11	PC BOARD, ANTENNA	
907	*1-618-353-11	PC BOARD, CONNECTOR	

ELECTRICAL PARTS

Ref.No.	Part No.	Description
C609	1-123-607-00	ELECT 0.1MF 20% 50V
C610	1-101-005-00	CERAMIC 0.022MF 50V
C611	1-101-005-00	CERAMIC 0.022MF 50V
C612	1-101-005-00	CERAMIC 0.022MF 50V
C613	1-101-005-00	CERAMIC 0.022MF 50V
C614	1-101-005-00	(G-AEP)...CERAMIC 0.022MF 50V
C615	1-101-005-00	(G-AEP)...CERAMIC 0.022MF 50V
C701	1-123-333-00	ELECT 100MF 20% 16V
C702	1-161-494-00	CERAMIC 0.022MF 30% 25V
C703	1-102-852-00	CERAMIC 47PF 5% 50V
C704	1-102-852-00	CERAMIC 47PF 5% 50V
C705	1-123-369-00	ELECT 4.7MF 20% 50V
C706	1-123-380-00	(ST-V70L)...ELECT 1MF 20% 50V
C710	1-161-494-00	CERAMIC 0.022MF 30% 25V
C801	1-123-611-00	(ST-V70L)...ELECT 1MF 20% 50V
C802	1-123-613-00	(ST-V70L)...ELECT 3.3MF 20% 50V
C803	1-162-288-31	(ST-V70L)...CERAMIC 330PF 10% 50V
C804	1-123-821-00	(ST-V70L)...ELECT 47MF 20% 16V
C805	1-162-294-31	(ST-V70L)...CERAMIC 0.001MF 10% 50V
C806	1-102-531-00	(ST-V70L)...CERAMIC 150PF 5% 50V
C807	1-102-531-00	(ST-V70L)...CERAMIC 150PF 5% 50V
C808	1-123-356-00	(ST-V70L)...ELECT 10MF 20% 25V
C809	1-101-005-00	(ST-V70L)...CERAMIC 0.022MF 50V
CF101	1-567-389-11	FILTER, CERAMIC
CF102	1-567-389-11	FILTER, CERAMIC
CF103	1-567-389-11	(G-AEP)...FILTER, CERAMIC
CF301	1-527-981-00	FILTER, CERAMIC
CF302	1-527-937-00	FILTER, CERAMIC
CF401	1-567-250-11	OSCILLATOR, CERAMIC
CF801	1-527-532-00	(ST-V70L)...OSCILLATOR, CERAMIC
CNJ401	1-562-068-13	SOCKET, CONNECTOR 13P
CNJ501	1-562-068-13	SOCKET, CONNECTOR 13P
CNJ701*	1-564-507-11	PLUG, CONNECTOR 4P
CNJ702*	1-564-508-11	PLUG, CONNECTOR 5P
CNJ801	1-558-456-11	(ST-V70L)...CORD (WITH CONNECTOR)
CT201	1-141-180-00	CAP, TRIMMER 15P
CT202	1-141-180-00	CAP, TRIMMER 15P
CT203	1-141-171-00	CAP, TRIMMER 20P
CT204	1-141-171-00	CAP, TRIMMER 20P
D301	8-719-902-79	DIODE KV1236Z
D302	8-719-107-94	DIODE 1SS202-1
D303	8-719-902-79	DIODE KV1236Z
D401	8-719-302-46	DIODE SEL1210S-C
D402	8-719-107-94	DIODE 1SS202-1
D501	8-719-511-20	DIODE S1VB20
D701	8-719-107-94	DIODE 1SS202-1
D702	8-719-107-94	DIODE 1SS202-1
D703	8-719-107-94	DIODE 1SS202-1
D704	8-719-107-94	DIODE 1SS202-1
D705	8-719-107-94	DIODE 1SS202-1
D706	8-719-107-94	DIODE 1SS202-1
D709	8-719-107-94	DIODE 1SS202-1
D710	8-719-107-94	DIODE 1SS202-1
D711	8-719-107-94	DIODE 1SS202-1
D712	8-719-107-94	DIODE 1SS202-1
D713	8-719-107-94	DIODE 1SS202-1
D714	8-719-107-94	DIODE 1SS202-1

ELECTRICAL PARTS

Ref.No.	Part No.	Description
D715	8-719-107-94	DIODE 1SS202-1
D716	8-719-107-94	DIODE 1SS202-1
D717	8-719-107-94	DIODE 1SS202-1
D718	8-719-107-94	DIODE 1SS202-1
D719	8-719-107-94	DIODE 1SS202-1
D720	8-719-107-94	(ST-V70L)...DIODE 1SS202-1
D721	8-719-107-94	(ST-V70L)...DIODE 1SS202-1
D801	8-719-110-32	(ST-V70L)...DIODE PH302B
D802	8-719-107-94	(ST-V70L)...DIODE 1SS202-1
FE101	1-463-609-11	(AEP,UK)...FRONT END, FM (FEE-3012A)
FE101	1-463-611-11	(G-AEP)....FRONT END, FM (FEE-4013A)
IC301	8-759-801-81	IC LA1265
IC401	8-759-801-80	IC LA3401
IC501	8-759-802-61	IC LA5666
IC601	8-759-202-63	IC TC9172P
IC701	8-759-207-45	IC TC9302AF-018
IC801	8-759-603-43	(ST-V70L)...IC 50760-421P
IC802	8-759-010-60	(ST-V70L)...IC CX20106
L101	1-410-564-21	MICRO INDUCTOR 100UH
L102	1-410-564-21	(G-AEP)...MICRO INDUCTOR 100UH
L209	1-410-568-21	MICRO INDUCTOR 220UH
L301	1-408-920-00	MICRO INDUCTOR 4.7MMH
L501	1-410-564-21	MICRO INDUCTOR 100UH
LCD701	1-807-409-11	DISPLAY PANEL, LIQUID CRYSTAL
LPF401	1-235-221-00	(G-AEP)...FILTER, LOW PASS
PL501	1-518-511-81	LAMP, PILOT
Q101	8-729-201-96	TRANSISTOR 2SC380TM-Y
Q102	8-729-201-96	TRANSISTOR 2SC380TM-Y
Q103	8-729-201-96	(ST-V70L)...TRANSISTOR 2SC380TM-Y
Q104	8-729-201-96	(ST-V70L)...TRANSISTOR 2SC380TM-Y
Q201	8-729-900-80	TRANSISTOR DTC114ES
Q202	8-729-900-80	TRANSISTOR DTC114ES
Q203	8-729-900-80	TRANSISTOR DTC114ES
Q204	8-729-606-33	TRANSISTOR 2SC2603F
Q205	8-729-117-54	TRANSISTOR 2SA1175
Q206	8-729-900-80	TRANSISTOR DTC114ES
Q301	8-729-900-80	TRANSISTOR DTC114ES
Q401	8-729-900-80	TRANSISTOR DTC114ES
Q501	8-729-900-80	(ST-V70L)...TRANSISTOR DTC114ES
Q502	8-729-900-80	TRANSISTOR DTC114ES
Q503	8-729-606-33	TRANSISTOR 2SC2603F
Q504	8-729-900-65	TRANSISTOR DTA144ES
Q601	8-729-203-05	TRANSISTOR 2SK30A-GR3
Q602	8-729-201-84	TRANSISTOR 2SC3112-B
Q603	8-729-203-05	TRANSISTOR 2SK30A-GR3
Q604	8-729-201-84	TRANSISTOR 2SC3112-B
Q801	8-729-606-33	TRANSISTOR 2SC2603F
Q802	8-729-606-33	TRANSISTOR 2SC2603F
R101	⚠ 1-247-115-00	CARBON 220 5% 1/4W F
R102	1-247-819-00	(AEP,UK)...CARBON 330 5% 1/6W
R102	1-247-821-00	(G-AEP)....CARBON 390 5% 1/6W
R103	1-247-819-00	(AEP,UK)...CARBON 330 5% 1/6W
R103	1-247-831-00	(G-AEP)....CARBON 1K 5% 1/6W

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

SECTION 6
ELECTRICAL PARTS LIST

NOTE:
- Items marked " ★ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- If there are two or more same circuitsin a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

CAPACITORS:
MF:μF, PF:μμF.

RESISTORS
- All resistors are in ohms.
- F : nonflammable

COILS
- MMH : mH, UH : μH

SEMICONDUCTORS
In each case, U : μ, for example:
UA...: μA..., UPA...: μPA..., UPC...: μPC,
UPD...: μPD...

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
901	A-4351-500-A	MOUNTED PCB, TUNER			
902	*1-562-327-00	SOCKET, CONNECTOR 3P			
903	*1-562-327-00	SOCKET, CONNECTOR 3P			
905	*1-618-065-11	PC BOARD, CONTROL SWITCH			
906	*1-618-352-11	PC BOARD, ANTENNA			
907	*1-618-353-11	PC BOARD, CONNECTOR			
908	*1-562-249-00	SOCKET, CONNECTOR 4P			
BA701	1-528-120-00	BATTERY, LITHIUM (CR-2025)			
C101	1-162-294-31	CERAMIC	0.001MF	10%	50V
C102	1-162-294-31	CERAMIC	0.001MF	10%	50V
C103	1-123-332-00	ELECT	47MF	20%	16V
C104	1-161-494-00	CERAMIC	0.022MF	30%	25V
C105	1-161-494-00	CERAMIC	0.022MF	30%	25V
C106	1-161-494-00	CERAMIC	0.022MF	30%	25V
C107	1-161-494-00	(G-AEP)...CERAMIC	0.022MF	30%	25V
C108	1-161-494-00	(G-AEP)...CERAMIC	0.022MF	30%	25V
C201	1-161-494-00	CERAMIC	0.022MF	30%	25V
C202	1-102-880-00	CERAMIC	15PF	5%	50V
C203	1-104-069-00	POLYSTYRENE	470PF	5%	50V
C204	1-101-006-00	CERAMIC	0.047MF		50V
C205	1-161-494-00	CERAMIC	0.022MF	30%	25V
C206	1-101-888-00	CERAMIC	68PF	5%	50V
C207	1-161-494-00	CERAMIC	0.022MF	30%	25V
C208	1-102-703-21	CERAMIC	120PF	5%	50V
C209	1-104-060-00	POLYSTYRENE	200PF	5%	50V
C210	1-162-301-31	CERAMIC	0.0015MF	30%	16V
C211	1-102-120-00	CERAMIC	0.0018MF	10%	50V
C212	1-161-494-00	CERAMIC	0.022MF	30%	25V
C213	1-101-006-00	CERAMIC	0.047MF		50V
C236	1-101-971-00	CERAMIC	15PF	5%	50V
C301	1-123-332-00	ELECT	47MF	20%	16V
C302	1-161-494-00	CERAMIC	0.022MF	30%	25V
C303	1-101-006-00	CERAMIC	0.047MF		50V
C304	1-101-006-00	CERAMIC	0.047MF		50V
C305	1-123-382-00	ELECT	3.3MF	20%	50V
C306	1-123-380-00	ELECT	1MF	20%	50V
C307	1-162-211-31	(AEP,UK)...CERAMIC	33PF	5%	50V
C307	1-162-290-31	(G-AEP)....CERAMIC	470PF	10%	50V
C308	1-161-494-00	CERAMIC	0.022MF	30%	25V
C309	1-123-382-00	ELECT	3.3MF	20%	50V
C310	1-123-382-00	ELECT	3.3MF	20%	50V
C311	1-161-494-00	CERAMIC	0.022MF	30%	25V
C312	1-123-382-00	ELECT	3.3MF	20%	50V
C313	1-162-215-31	CERAMIC	47PF	5%	50V

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
C314	1-123-369-00	ELECT	4.7MF	20%	50V
C315	1-101-006-00	CERAMIC	0.047MF		50V
C316	1-123-356-00	ELECT	10MF	20%	25V
C317	1-161-494-00	CERAMIC	0.022MF	30%	25V
C318	1-162-207-31	CERAMIC	22PF	5%	50V
C319	1-161-494-00	CERAMIC	0.022MF	30%	25V
C370	1-123-369-00	ELECT	4.7MF	20%	50V
C401	1-108-583-00	MYLAR	0.015MF	5%	50V
C402	1-162-286-31	(G-AEP)...CERAMIC	220PF	10%	50V
C403	1-123-356-00	ELECT	10MF	20%	25V
C404	1-162-288-31	CERAMIC	330PF	10%	50V
C405	1-108-595-00	MYLAR	0.047MF	5%	50V
C406	1-123-356-00	ELECT	10MF	20%	25V
C407	1-162-288-31	CERAMIC	330PF	10%	50V
C408	1-162-288-31	CERAMIC	330PF	10%	50V
C409	1-123-382-00	ELECT	3.3MF	20%	50V
C410	1-123-382-00	ELECT	3.3MF	20%	50V
C411	1-162-294-00	(G-AEP)...CERAMIC	0.001MF	10%	50V
C412	1-162-294-00	(G-AEP)...CERAMIC	0.001MF	10%	50V
C413	1-123-356-00	ELECT	10MF	20%	25V
C414	1-123-380-00	ELECT	1MF	20%	50V
C415	1-123-380-00	ELECT	1MF	20%	50V
C416	1-123-608-00	ELECT	0.22MF	20%	50V
C417	1-123-382-00	ELECT	3.3MF	20%	50V
C418	1-161-494-00	CERAMIC	0.022MF	30%	25V
C419	1-123-332-00	ELECT	47MF	20%	16V
C425	1-101-002-00	CERAMIC	0.0022MF		50V
C426	1-101-002-00	CERAMIC	0.0022MF		50V
C501	1-101-004-00	CERAMIC	0.01MF		50V
C502	1-101-004-00	CERAMIC	0.01MF		50V
C503	1-101-004-00	CERAMIC	0.01MF		50V
C504	1-101-004-00	CERAMIC	0.01MF		50V
C505	1-124-901-00	ELECT	1000MF	20%	35V
C506	1-123-356-00	ELECT	10MF	20%	25V
C507	1-161-494-00	CERAMIC	0.022MF	30%	25V
C509	1-123-332-00	ELECT	47MF	20%	16V
C510	1-161-494-00	CERAMIC	0.022MF	30%	25V
C515	1-101-005-00	CERAMIC	0.022MF		50V
C602	1-161-494-00	CERAMIC	0.022MF	30%	25V
C603	1-123-356-00	ELECT	10MF	20%	25V
C604	1-123-379-00	ELECT	0.47MF	20%	50V
C605	1-123-379-00	ELECT	0.47MF	20%	50V
C606	1-123-332-00	ELECT	47MF	20%	16V
C607	1-161-494-00	CERAMIC	0.022MF	30%	25V
C608	1-130-776-00	FILM	0.47MF	5%	63V

ELECTRICAL PARTS

Ref.No.	Part No.	Description				
R104	1-247-821-00	(G-AEP)....CARBON	390	5%	1/6W	
R105	1-249-432-11	CARBON	18K	5%	1/6W	
R106	1-247-819-00	CARBON	330	5%	1/6W	
R107	1-249-414-11	CARBON	560	5%	1/6W	
R108	1-247-819-00	CARBON	330	5%	1/6W	
R109	1-249-434-11	CARBON	27K	5%	1/6W	
R110	1-249-432-11	(G-AEP)....CARBON	18K	5%	1/6W	
R111	1-247-819-00	(G-AEP)....CARBON	330	5%	1/6W	
R112	1-247-829-00	(G-AEP)....CARBON	820	5%	1/6W	
R113	1-247-819-00	(G-AEP)....CARBON	330	5%	1/6W	
R114	1-249-434-11	(G-AEP)....CARBON	27K	5%	1/6W	
R201	1-247-893-00	CARBON	390K	5%	1/6W	
R202	1-247-879-00	CARBON	100K	5%	1/6W	
R203	1-249-425-11	CARBON	4.7K	5%	1/6W	
R204	1-249-425-11	CARBON	4.7K	5%	1/6W	
R205	1-249-429-11	CARBON	10K	5%	1/6W	
R206	1-247-893-00	CARBON	390K	5%	1/6W	
R207	1-247-879-00	CARBON	100K	5%	1/6W	
R208	1-247-903-00	CARBON	1M	5%	1/6W	
R209	1-247-879-00	CARBON	100K	5%	1/6W	
R210	1-249-434-11	CARBON	27K	5%	1/6W	
R211	1-249-433-11	CARBON	22K	5%	1/6W	
R212	1-249-421-11	CARBON	2.2K	5%	1/6W	
R213	1-249-433-11	CARBON	22K	5%	1/6W	
R214	1-247-823-00	CARBON	470	5%	1/6W	
R301 ⚠	1-247-119-00	CARBON	330	5%	1/4W	F
R302	1-247-849-00	CARBON	5.6K	5%	1/6W	
R303	1-249-433-11	CARBON	22K	5%	1/6W	
R304	1-247-847-00	CARBON	4.7K	5%	1/6W	
R305	1-247-805-00	CARBON	82	5%	1/6W	
R306	1-247-843-00	CARBON	3.3K	5%	1/6W	
R307	1-249-429-11	CARBON	10K	5%	1/6W	
R308	1-249-429-11	CARBON	10K	5%	1/6W	
R309	1-247-801-00	CARBON	56	5%	1/6W	
R315	1-247-831-00	CARBON	1K	5%	1/6W	
R320	1-247-823-00	CARBON	470	5%	1/6W	
R321	1-249-421-11	(G-AEP)...CARBON	2.2K	5%	1/6W	
R322	1-247-831-00	CARBON	1K	5%	1/6W	
R402	1-249-425-11	CARBON	4.7K	5%	1/6W	
R403	1-249-429-11	CARBON	10K	5%	1/6W	
R404	1-247-885-00	CARBON	180K	5%	1/6W	
R405	1-247-885-00	CARBON	180K	5%	1/6W	
R406	1-247-883-00	CARBON	150K	5%	1/6W	
R407	1-247-883-00	CARBON	150K	5%	1/6W	
R408	1-249-425-11	CARBON	4.7K	5%	1/6W	
R409	1-249-425-11	CARBON	4.7K	5%	1/6W	
R410	1-249-425-11	CARBON	4.7K	5%	1/6W	
R411	1-249-425-11	CARBON	4.7K	5%	1/6W	
R412	1-247-879-00	CARBON	100K	5%	1/6W	
R413	1-247-717-11	CARBON	2.2K	5%	1/4W	
R414	1-247-879-00	CARBON	100K	5%	1/6W	
R415	1-249-425-11	CARBON	4.7K	5%	1/6W	
R416	1-247-831-00	CARBON	1K	5%	1/6W	
R417	1-247-853-00	CARBON	8.2K	5%	1/6W	
R418	1-247-849-00	CARBON	5.6K	5%	1/6W	
R419 ⚠	1-247-109-00	CARBON	120	5%	1/4W	F
R420	1-249-429-11	CARBON	10K	5%	1/6W	
R501	1-247-783-00	(ST-V70L)...CARBON	10	5%	1/6W	

ELECTRICAL PARTS

Ref.No.	Part No.	Description				
R502 ⚠	1-213-127-00	METAL OXIDE	47	5%	1W	F
R504	1-249-437-11	CARBON	47K	5%	1/6W	
R506	1-249-429-11	CARBON	10K	5%	1/6W	
R602	1-247-831-00	CARBON	1K	5%	1/6W	
R603	1-247-831-00	CARBON	1K	5%	1/6W	
R604	1-247-831-00	CARBON	1K	5%	1/6W	
R605	1-247-831-00	CARBON	1K	5%	1/6W	
R606 ⚠	1-247-107-00	CARBON	100	5%	1/4W	F
R607	1-249-437-11	CARBON	47K	5%	1/6W	
R608	1-249-414-11	CARBON	560	5%	1/6W	
R609	1-247-829-00	CARBON	820	5%	1/6W	
R610	1-247-817-00	CARBON	270	5%	1/6W	
R611	1-247-867-00	CARBON	33K	5%	1/6W	
R612	1-249-421-11	CARBON	2.2K	5%	1/6W	
R613	1-249-425-11	CARBON	4.7K	5%	1/6W	
R614 ⚠	1-247-107-00	CARBON	100	5%	1/4W	F
R615	1-247-831-00	CARBON	1K	5%	1/6W	
R616	1-249-414-11	CARBON	560	5%	1/6W	
R617	1-247-833-00	CARBON	1.2K	5%	1/6W	
R618	1-247-817-00	CARBON	270	5%	1/6W	
R619	1-249-433-11	CARBON	22K	5%	1/6W	
R620	1-249-421-11	CARBON	2.2K	5%	1/6W	
R621	1-249-425-11	CARBON	4.7K	5%	1/6W	
R701	1-249-425-11	CARBON	4.7K	5%	1/6W	
R702	1-247-807-00	CARBON	100	5%	1/6W	
R703	1-247-843-00	CARBON	3.3K	5%	1/6W	
R704	1-249-437-11	CARBON	47K	5%	1/6W	
R801	1-247-791-00	(ST-V70L)...CARBON	22	5%	1/6W	
R802	1-247-886-00	(ST-V70L)...CARBON	200K	5%	1/6W	
R803	1-249-433-11	(ST-V70L)...CARBON	22K	5%	1/6W	
R804	1-247-819-00	(ST-V70L)...CARBON	330	5%	1/6W	
R805	1-249-429-11	(ST-V70L)...CARBON	10K	5%	1/6W	
R806	1-249-429-11	(ST-V70L)...CARBON	10K	5%	1/6W	
R807	1-247-831-00	(ST-V70L)...CARBON	1K	5%	1/6W	
R808	1-249-429-11	(ST-V70L)...CARBON	10K	5%	1/6W	
R809	1-247-831-00	(ST-V70L)...CARBON	1K	5%	1/6W	
R810	1-247-783-00	(ST-V70L)...CARBON	10	5%	1/6W	
R813	1-249-429-11	(ST-V70L)...CARBON	10K	5%	1/6W	
R814	1-249-429-11	(ST-V70L)...CARBON	10K	5%	1/6W	
R815	1-247-903-00	(ST-V70L)...CARBON	1M	5%	1/6W	
R816	1-247-843-00	(ST-V70L)...CARBON	3.3K	5%	1/6W	
R817	1-249-429-11	(ST-V70L)...CARBON	10K	5%	1/6W	
R818	1-249-429-11	(ST-V70L)...CARBON	10K	5%	1/6W	
R819	1-249-429-11	(ST-V70L)...CARBON	10K	5%	1/6W	
RV301	1-228-996-00	RES, ADJ, CARBON 47K				
RV302	1-228-994-00	RES, ADJ, CARBON 10K				
RV401	1-228-998-00	RES, ADJ, CARBON 220K				
S701	1-554-303-21	SWITCH, KEY BOARD (1)				
S702	1-554-303-21	SWITCH, KEY BOARD (2)				
S703	1-554-303-21	SWITCH, KEY BOARD (3)				
S704	1-554-303-21	SWITCH, KEY BOARD (4)				
S705	1-554-303-21	SWITCH, KEY BOARD (5)				
S706	1-554-303-21	SWITCH, KEY BOARD (6)				
S707	1-554-303-21	SWITCH, KEY BOARD (7)				
S708	1-554-303-21	SWITCH, KEY BOARD (8)				
S709	1-554-303-21	SWITCH, KEY BOARD (9)				
S710	1-554-303-21	SWITCH, KEY BOARD (0)				

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

ELECTRICAL PARTS

Ref.No.	Part No.	Description
S711	1-554-303-21	SWITCH, KEY BOARD (MEMORY)
S712	1-554-303-21	SWITCH, KEY BOARD (ENTER)
S716	1-554-303-21	SWITCH, KEY BOARD (MEMORY SCAN)
S717	1-554-303-21	SWITCH, KEY BOARD (-)
S718	1-554-303-21	SWITCH, KEY BOARD (+)
S719	1-554-303-21	SWITCH, KEY BOARD (BAND)
S721	1-554-303-21	SWITCH, KEY BOARD (FM TUNING MODE)
T201	1-402-080-11	COIL, ANT (MW)
T202	1-406-089-11	COIL, OSC (MW)
T203	1-402-071-11	COIL, ANT (LW)
T204	1-406-207-11	COIL, OSC (LW)
T301	1-404-659-11	COIL, DISCRIMINATOR
T302	1-404-535-11	COIL (WITH IFT)
T401	1-235-126-00	(G-AEP)...ENCAPSULATED COMPONENT
TM101	1-536-707-00	(G-AEP)....TERMINAL BOARD, PUSH 2P
TM101	1-536-708-00	(AEP,UK)...TERMINAL BOARD, PUSH 4P
TM102	1-563-199-11	(G-AEP)...CONNECTOR, PAL
TP301	*1-560-060-00	PIN, CONNECTOR 2P
TP701	*1-560-063-00	PIN, CONNECTOR 5P
XT701	1-567-125-00	VIBRATOR, CRYSTAL

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